Site-corrected leaf wax biomarker records synthesized to characterize East African Plio-Pleistocene climate

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Climate change has been hypothesized to play a critical role in human evolution, but the mechanisms behind this relationship are difficult to test due to a lack of long paleoclimate records from hominin fossil locales. We have analyzed hydrogen isotopic composition of terrestrial leaf waxes to reconstruct regional hydroclimate from Ethiopian and Kenyan lake drill cores spanning the Pliocene to modern. We measured LGM-modern sediment in order to correct each paleorecord for regional differences in δD_{wax} mean and variance. We find that there is a step-wise enrichment in δD_{wax}, signifying a shift from a wet to dry climate from the Pliocene to the Pleistocene, perhaps implying an influence of global temperature, ice sheet extent, and/or atmospheric greenhouse gas concentrations on East African climate. However, the shift is small relative to the amplitude of orbital-scale isotopic variations. The records indicate a strong influence of eccentricity-modulated orbital precession and imply that local insolation is the likely cause of precipitation variability. Several intervals of high variability coincide with turnover, dispersal, and/or technological transitions, suggesting that climate variability may play a key role in hominin evolution.